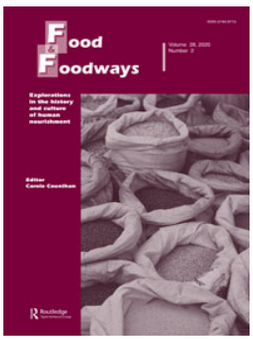

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Crafting innovation: Continuity and change in the "living traditions" of contemporary artisan cheesemakers

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ABSTRACT

Artisan cheese enthusiasts often celebrate the preservation of tradition, while the marketplace in heritage foods pays a premium for products cast as traditional. But ethnographic research with cheesemakers revealed a complex dynamic between continuity and change. Practices that some considered essential to tradition were considered dispensable—even problematic—by others. While external forces compelled some changes, cheesemakers voluntarily—sometimes enthusiastically—embraced others. Cheesemakers sometimes saw new technologies as means of enhancing product quality, consumer safety, environmental sustainability, animal welfare or even crafting practice itself. Those dispensing with elements of tradition often saw doing so as essential to preserving other elements and, hence, continuity was sometimes the very justification for change. This article explores the varied ways in which artisan cheesemakers reconcile innovation and the conservation of tradition, and reveals the inventiveness of those who sustain "living traditions".

KEYWORDS

Cheese; artisan; craft; innovation; conservation

Introduction

Speaking to the American Cheese Society in 2008, food writer and cheesemonger Daphne Zepos asked, in reference to what she called European "classics" such as Emmenthal, Crotin, and Gouda, "How is it that some cheeses survive, year after year, generation after generation, century after century, and continue to be made in very much the same way today?" (Zepos et al. 2008, 1-3). Words like hers—treating their object of affection as timeless—are commonplace in the world of contemporary craft. During the years I have researched artisan cheesemaking, I have heard not only aficionados but also cheesemakers themselves wax lyrical about how the craft traditions

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they practice connect them to their forebears. Many have echoed the 19th century art critic John Ruskin, who—paraphrased by Alexander Langlands—conceived of "the true value in an object … being derived from the pleasure taken in creating it" (Langlands 2017, 28), often emphasizing the importance to this of working with their hands as cheesemakers did in generations past.

"Value" in contemporary craft is not merely a function of the maker's experience, however. Despite tendencies to downplay it, value is also shaped by the marketplace. Cheesemonger, food writer, and anthropology graduate Bronwen Bromberger has written: "Consumers value farmhouse cheeses not only for their taste, but also for their 'traditional' and 'authentic' qualities, which embody time-honored cultural practices" (Bromberger 2006, 68).[1] Consumers often contrast authentic and traditional with modern and industrial—associating the latter with products they see as materially impure, devoid of cultural significance, and/or environmentally unsustainable, not to mention bland and boring (West 2016, 409-412). Such conceptions betray a propensity to cast industry as an intrusion into the unspoiled garden of nature—a perspective Leo Marx associated with American culture (Marx 1964)[2], but which may surely be found to varying degrees elsewhere. They also echo Walter Benjamin, who suggested in the 1930s that mechanically-produced goods may be seen as mere copies, lacking the aura of true originals (Benjamin 1968 [1935]).

Such attitudes have long shaped artisan practice. Sarah Fayen Scarlett recounts that, although the late 19th/early 20th century maker of "artistic furniture" Charles Rohlfs trained in large cast-iron stove factories, he later wrote this experience out of his self-presentation because "he could not sell himself as an artist or as a craftsman in the Arts and Crafts mode if he had been tainted by what had come to be seen as the mechanical, inhuman influence of industry" (Scarlett 2011, 28, 30). Contemporary artisan cheesemakers similarly take heed of consumer aversions and expectations. Bromberger tells us that artisan cheesemaking is "viable" today only "because of the revalorization of typical local foods, exemplified by the fact that people are willing to pay up to five times as much for artisanal cheeses as for their industrial counterparts"—numbers that, she concludes, "demand respect" (Bromberger 2006, 88).

However, while accentuating tradition may yield good economic returns, the world of artisan cheesemaking is not so straightforward. Bromberger herself cautions that authenticity and tradition may be "wrapped up in a well-developed product mythology" (Bromberger 2006, 68). Myths may sell cheese, but they also gloss complex realities, ultimately presenting cheesemakers with new problems. In the French Auvergne, the Vergnol family told us they were sometimes trapped by their own story of giving rebirth to traditional farmhouse Fourme d'Ambert—a cheese that had, for decades,

Figure 1. The Vergnols giving new life to farmhouse Forme d'Ambert in a stainless-steel vat.

only been made by large cooperatives. Soon after they began making cheese, a journalist traveled several hours from Paris to document the project, but left within minutes because the stainless-steel vats they used did not accord with the vision of tradition readers craved (Vergnol, Vergnol and Vergnol 2007). (Figure 1) In the French Cantal, we watched Georges Fabre and his herdsmen milk cows in high-mountain pastures and make Salers Tradition cheese in a wooden vat without a starter culture, as his forebears did; but they struggled to meet EU food safety norms as a result, even though their cheese was safe for consumption (Fabre 2007). For makers like these, preserving tradition proved complicated.

No cheesemaker with whom we worked would have gone so far as Michael Herzfeld, who suggested in his study of contemporary Greek artisans that tradition was like "a millstone around the necks of those … condemned to produce it" (Herzfeld 2004, back cover). But as Bromberger has pointed out, artisan cheesemakers today not only must produce "goods that embody a former way of life", they also must "draw a profit." Simultaneously realizing these aims, she tells us, requires "both adherence to and manipulation of 'tradition'" (Bromberger 2006, 69). The sociologist Edward Shils has suggested that it is precisely because people must make a living and support their offspring that they cannot live "entirely under the domination of tradition" (Shils 1981, 27). Most cheesemakers we met knew that, to preserve tradition, they had to preserve their livelihoods, their families, and their wellbeing. In St. Nectaire (also in Auvergne), Alphonse

Bellonte told us that cheesemaking knowledge had been passed down through the generations, albeit in the midst of changing circumstances. For tradition to be preserved, he told us, it had to evolve; its bearers could not become relics. Rather, they had to embody what he called a "living tradition"—one that absorbed new ideas and technologies over time. The alternative was not a purer form of tradition, but rather a moribund one (Bellonte 2006, 6, 23).

The imperative to survive as artisans led most cheesemakers with whom we worked to innovate, albeit selectively. For example, Alphonse's sister-in-law, Doudoune Bellonte, told us that because hand-pressing curd in a cold dairy for hours on end had caused family members to suffer repetitive stress injuries, they had decided to install hydraulic presses to safeguard the health of family members upon whom the enterprise depended (Bellonte 2006, 15). In North Holland (Netherlands), Lia Koopman told us she used a commercial starter culture instead of making her own (as she had previously) because the latter took time she preferred to spend with her children (Koopman and Koopman 2007, 30, 38). So, while artisan cheesemakers today spend considerable time thinking about tradition, with good reason, they also invest much time and energy reflecting on and engaging with new methods and technologies, for reasons just as good. Therefore, whereas Glenn Adamson (2013) has reminded us how craft has remained an integral component of making processes within the historical context of mechanization,[3] an examination of cheesemaking today shows how innovation and the use of new technologies have been vital to the contemporary craft renaissance.

The idea that traditions are continuously transformed by the very individuals who reproduce them will be familiar to anthropologists and folklorists—especially those working within the theoretical frameworks of "practice" and "performance" (Cashman, Mould and Shukla 2011). Such ideas remain under-explored, however, in the newer fields of craft studies and food studies, perhaps because these fields have emerged amidst popular enthusiasm for craft traditions within the context of late-capitalist disenchantment with modernity (Marchand 2016, 5) and the romanticization of craft that has accompanied such interest. There are, by now, several nuanced analyses of artisan food making (e.g., Bowen 2015, Weiss 2016), including excellent studies of cheesemaking (e.g. Paxson 2013, Grasseni 2016). But to date, discussion of how contemporary artisan decision-making reconciles innovation with the preservation of heritage is under-developed. To this end, this article surveys the many different kinds of innovation undertaken by artisan cheesemakers, their motives for and feelings about change, the forces shaping their choices, and the consequences of innovation for craft traditions.

The underpinning research is unique in its geographical scope. Since 2003, I have worked with more than 200 cheesemakers, as well as dozens of affineurs,

cheesemongers and officials, in 30 different regions in 13 countries. The research started with work at the London cheesemonger, Neal's Yard Dairy, who facilitated contacts with cheesemakers in the United Kingdom, as well as with leading cheesemongers elsewhere in Europe and North America who subsequently made introductions to cheesemakers in their respective countries. Cheesemakers were also identified through the intermediary of cheese festivals and organizations such as Slow Food. Cheesemakers ranged from those working individually to small enterprises hiring up to a dozen employees, and included men and women of diverse ages, as well as young people working in family businesses. Time spent with cheesemakers ranged from half-days accompanying "the make" to assisting in cheesemaking in one case for weeks at a time over several years. I often conducted research along with post-graduate students or colleagues with shared interests (see acknowledgements), and in the five countries where I did not speak local languages (Greece, Italy, Poland, Spain, Turkey), they interpreted for me. (I therefore refer to research that "we" conducted, although this article is individually authored).

The extensive nature of the research meant I was only in some instances able to assemble detailed ethnographic portraits of cheesemakers or regions, but it afforded a broader picture of an inter-connected, albeit uneven, "revival" of artisan cheesemaking with global dimensions. This picture reveals surprising commonalities, as cheesemakers in disparate places face dilemmas arising from similar kinds of forces, such as food safety regulation or shifting market expectations. At the same time, because such forces have taken different forms from place to place, and because cheesemaker experiences of them are mediated by myriad factors of a more particular kind (local culture, family histories, previous work experience, etc.), this picture proves resistant to the elaboration of taxonomies and the sorts of categorical claims to which these might give rise. In short, the ways that we saw cheesemakers reconcile innovation with tradition differed within regions while resembling those elsewhere, for example, or differed amongst those of similar scale with resemblances cutting across scales. Everywhere, however, we observed that innovation and the preservation of tradition were profoundly intertwined, and that decision making was a multiplex process, yielding bespoke outcomes. This article therefore seeks to heighten readers' appreciation for the complexity of the task faced by contemporary artisans—who must preserve heritage while earning a livelihood in the modern world—and to make greater sense of the various choices—sometimes compromises—they make along the way.

Continuity, but of what?: Sacred traditions and expedient changes

Artisan cheesemakers with whom we worked exhibited a range of dispositions regarding tradition and its transformation, expressing complex—

sometimes contradictory—views. To be sure, many nestled into underpinning routines—whether seasonal, daily, or even the repetitive motions of batch-making. In County Cork (Ireland), Milleens maker Norman Steele told us he found cheesemaking "monastic": "You go through this routine, and even when you're cutting the curd, there would be this sort of clunk on the tank that sounded like a bell … And so, you do get into it in a strange—well, we're not at all a religious bunch in any modern or ancient way, but there is a funny sort of feeling of respect too for what it is you're doing" (Steele, Steele and Steele 2009). Such "respect" could nurture conservatism in practice. David Major—who makes Vermont Shepherd—told us: "I know that there are newer and better technologies, but I've made the choice to stick with a system that I know works in order to not get into something that I know will then take another three or four years to pay for itself, and not be sure what the impact on the cheese will be." He compared changes to computer system upgrades—promising something better, but often producing problems that took more time to resolve than they saved (Major 2008).

Conservatism sometimes took the form of refusal to adopt new technologies seen as "corruptions" of tradition or as detrimental to quality. Çiftçiler Gida—who made Beyaz Peynir in Eastern Trace (Turkey)— told us resolutely that he did not use commercial starters. To him, "cultured cheese" was not really cheese (Gida 2011). Polish cheesemakers we visited generally regarded starter cultures as "additives" compromising a cheese's purity (Brodska 2011, 15). In Avellino (Italy), Carmine Nigro refused to use an astringent—like vinegar—to make ricotta from pecorino whey, which he considered "unnatural", instead using fig sap to promote coagulation, as his forebears had (Nigro 2010). In Asturias (Spain), Gamenedo del Puerto makers had collectively agreed against using commercial penicillium to foster blue veining in their cheeses, instead relying on molds indigenous to their caves (Kleinegri 2010). Doudoune Bellonte told us her family did not use commercial spray molds, as larger manufacturers did. "Our caves have all the right molds in them," she said defiantly (Bellonte 2006). Similarly, Parmigiano-Reggiano makers refused to use formaldehyde as a preservative (a method adopted during World War II to produce rations, and still practiced by Grana Padano producers) (Zannoni 2008), while some makers of cloth-bound British "territorial" cheeses refused to use methyl bromide, as others did, to control mites feeding on their cheeses' rinds (a practice since prohibited by law).

Most cheesemakers, however, were not averse to innovation. Many—including some who simultaneously celebrated routine—enjoyed tinkering with productive processes to improve efficiency or product quality. Some Polish cheesemakers had responded to consumer desires by adding herbs,

caraway seeds, olives, garlic, cumin, or paprika to their cheeses (Gremza 2010). In the Portuguese Alentejo, Serpa makers had historically reacted to consumer uptake of domestic refrigerators in which perishable foods kept longer by making softer, creamier cheeses (Lopes 2008a). Peio Etxeleku—who made Ossau-Iraty in the Basque Iparralde (France)—had started vacuum packing 30% of his product during peak season to slow down maturation in order to have cheese to sell year-round. Etxeleku was proud of Basque heritage, having built a museum at his Fromagerie Agour depicting Basque shepherding and cheesemaking traditions, but was constantly experimenting with new products and methods to "stay ahead of the curve" (Etxeleku 2009).

While some were more open to change than others, it would be inaccurate simply to divide cheesemakers into modernizers, disposed to innovate, and conservatives, cleaving to tradition. For most, innovation and the preservation of tradition were not mutually exclusive. Alphonse Bellonte—quoted above espousing "living traditions"—also told us that "continuity" mattered (Bellonte 2006), begging the question with which every cheesemaker seemed to contend, namely, *continuity of what*? For Alphonse, continuity of the family making cheese on their farm was paramount. For others, it was the taste of their cheese, producing in a traditional locale, or sustaining biodiversity. Indeed, almost every cheesemaker cast as sacred and inalterable one or more elements of tradition as they practiced it—the very essence of what they sought to preserve. At the same time, nearly every cheesemaker conceived of other elements of received tradition as non-essential—ones that could be modified without undermining what they considered sacred. For example, Mikel Etxezarreta and Elixabete Arrillaga, who made Idiazabal in the Basque Hegoalde (Spain), milked their ewes into a *kaiko*—a carved wooden pail with an integrated handle whose rhomboid profile reached out laterally from its base to catch milk falling from the animal's teats (Figure 2). Basque cheesemaking shepherds proudly told us the *kaiko* was uniquely Basque; Mikel and Elixabete considered its use essential to their craft. But they were not luddites. Their farm was lit by solar power, and they used a generator to run small machines on the farm and in the dairy (Etxezarreta and Arrillaga 2011).

Viewed collectively, nearly every element deemed essential to tradition by some was looked upon by others as inessential. Consider the following chain of cheesemakers, with one practice each considered sacred and another each was willing to change.

- Luciano and Mateo Catellani asserted that authentic Parmigiano-Reggiano cheese must be made from the milk of heritage breed cows;

Figure 2. A *kaiko*, used by Basque makers of Idiazabal.

but they were willing to feed their animals cut grass in the stable, a practice that had become commonplace only because imported breeds struggled with high temperatures in the region (Catellani 2008; Catellani and Catellani 2008; Zannoni 2008).

- Mary Quicke, who made cheddar in Devon (United Kingdom), highlighted the importance to her product of keeping her herds on pasture as much as possible; but after she was compelled to pasteurize her milk following an outbreak of bovine tuberculosis in her herd, she downplayed the importance of using raw milk (Quicke 2019).
- Jean-Paul Jaunarena considered use of raw milk essential to his Ossau-Iraty; but unlike his predecessors, he used a stainless-steel vat to comply with EU regulations (Jaunarena 2011).
- John Putnam, who made an Alpine-style cheese in Vermont—both on his farm, and at Spring Brook Farm where youth from urban schools learned cheesemaking—took inspiration from Alpine traditions, using copper-lined vats considered essential to precise temperature control; but while he hoisted the curd from his home vat in traditional fashion—using an enormous cheese cloth—he had advised Spring Brook to install a state-of-the-art vacuum pumping system to save time transferring curd from vat to form (Putnam 2008).
- Joe Schneider, who made Stichelton in Nottinghamshire (United Kingdom)—a cheese many said adhered more closely to Stilton tradition than PDO Stilton cheeses—insisted hand-ladelling was crucial to

preserving its fragile structure and traditional character; but, when we worked with him, he used a commercial starter (Schneider and Hodgson 2007, 50).

- Kazimierz Furczoń, who made Oscypek in the Polish Tatra mountains, refused to use a starter culture, relying instead on microflora harbored in his wooden vat; but he used commercial rennet because he found it more consistent (Furczoń 2010).
- Francisco Javier Muñoa, who made Idiazabal in the Basque Hegoalde (Spain), produced his own rennet from the stomach lining of slaughtered lambs from his flock, enhancing his cheese's connection to local terroir; but he used plastic molds, which complied with EU food safety standards (Muñoa 2011).
- Sylvain Chevasso, who made Beaufort Alpage for Jean-Pierre Perret on the edge of Lake Teuda in the French Savoie, used spruce bands to form his cheeses, as Beaufort makers have for centuries; but he used a motor-driven device to stir the curd after cutting (Chevasso and Perret 2009).
- Ana and José Bule, who made Serpa in the Portuguese Alentejo, still cut and stirred their curd entirely by hand; but they did not cure their cheese at ambient temperature in the dairy rafters, like Serpa makers used to, instead aging it in refrigerated storerooms (Bule and José Carrasco 2008).
- The Bellonte family insisted upon aging their St. Nectaire in natural caves harboring molds and fungi long associated with the cheese; but in contrast with the Catellanis at the top of this list, they had replaced their indigenous Salers cows with more productive Montbéliards from the Jura region (Bellonte 2006).

The do's and don'ts observed by these cheesemakers thus came full circle (one of many such circles potentially derived from our data) as cheesemakers selectively embraced modernity, even as they sought to preserve tradition as they conceived it. Such a picture is not unique to cheesemakers; it resonates with other contemporary crafts as well. Luke Emmet describes comparably selective innovation among craft lute makers, writing, "There is a tension between slavish adherence to, and creative departure from, lute making traditions." He concludes, "[w]hen creating a new lute you have to decide which aspects from the historic record are relevant and which are not for the particular instrument you are making" (Emmet 2018, 257). Similarly, as each cheesemaker we visited decided what was sacrosanct and what was not, they developed for themselves a unique equation. In the process, ends and means shaped one another in the enactment of principled pragmatism.

Compulsion or volition? Motives for change

The list above offers evidence that change has sometimes been foisted upon cheesemakers, as in the case of increasingly stringent food safety regulations. For example, European Union directives issued in 1993 required cheesemakers to use non-porous tools and work-surfaces. This led most to tile their dairies and adopt stainless-steel vats, worktables, curd cutters, and aging shelves, as well as plastic molds—whereas previously most of these objects were made of wood. These regulations allowed cheesemakers to apply for derogations where they could make the case that using porous materials was safe and essential to their product's characteristics. Salers Tradition makers successfully argued that use of a wooden vat (locally called a *gerle*) was essential. Parmigiano-Reggiano makers successfully applied for a derogation to continue using copper-lined vats. And Beaufort makers obtained permission to continue using spruce bands to form their cheeses.

Notwithstanding the importance of external pressures, however, many cheesemakers made changes of their own volition—what Shils categorizes as "endogenous changes" (Shils 1981, 213). Endogenous changes sometimes included ones making cheesemakers compliant with new regulations. Serpa makers Ana and José Bule adopted stainless-steel kit because it was "easier to work with" (Bule and José Carrasco 2008). The Bellontes told us they found a stainless-steel vat easier to clean (Bellonte 2006). Serpa maker Jaime Borges Lopes, and Edam maker Lia Koopman, each replaced wooden molds with plastic ones for similar reasons (Lopes 2008b; Koopman and Koopman 2007). Peio Etxeleku told us he started using plastic forms with 'micro-perforations' because easier cleaning yielded a safer product (Etxeleku 2009).

Other voluntary changes bore no relation to regulations, but were motivated by desires to improve productive processes or product quality. Tiago Varela Elias found that putting his Serpa cheeses in sacks of barley—which absorbed moisture—dried them out more gently than airing them on shelves in refrigerated storerooms: "It's not traditional," he told us, "but it works!" (Elias 2008). Cheesemakers also considered livestock wellbeing when making changes. Vermont cheesemaker Steve Getz's bespoke milking parlor both facilitated cleaning and minimized herd-stress; and contrary to established practice, he allowed his cows to stay in the stable in the daytime, and graze at night, which he said they preferred (Getz and Getz 2008). In Gelderland (Netherlands), Jan Dirk van de Voort kept his Jersey herd under a wall-less pavilion allowing them to see weather conditions and choose when to graze on adjacent pastures (van de Voort 2009). Such voluntary modifications were exemplary of Shils' idea that those making endogenous changes generally thought of them as "improvements" on a

tradition upon which they ultimately still depended for success (Shils 1981)—an idea neatly summed up by Cheddar maker Jamie Montgomery, who told Bromberger: "do what you've always done, but better" (Bromberger 2006, 74).

The elimination of craft or its enhancement? Ambivalence about new technology

Even as cheesemakers selectively embraced change, many held conflicting views on new technology. Ambivalence was especially pronounced around tools and techniques that might compromise their identities as artisans. Anthropologist Trevor Marchand argues that "changing technologies" and "mass production" threaten to make the very "subjectivities" of craftspeople redundant, along with the objects they make (Marchand 2016, 6). By way of illustration, consumers and artisan cheesemakers themselves often emphasize the importance of "hand-making". This disposition was essential to what we witnessed at the Caseificio Rivabianca, in Salerno (Italy), where the Mozzarella maker used a wooden paddle to laboriously stir the curd in a vat of water "slightly hotter than the hands (which constantly touch it) can bare"—his stirring arm, like a professional tennis player's, visibly more developed than the other; or to what we saw at Yaman Peynircilik, in Tekirdağ (Turkey), where it took two men to stretch Kaşar curd—pulling it into ropes several meters long, and several inches in diameter, folding it back on itself on a large table between them, and pulling it again, and again (Figure 3). Modern tools and machines may undermine such performances of skill, diminishing a product's perceived authenticity and its value in the craft market niche. Richard Sennett addresses this succinctly when he writes, "The greatest dilemma faced by the modern artisan-craftsman is the machine. Is it a friendly tool or an enemy replacing work of the human hand?" (Sennett 2008, 81).[4]

However, as Langlands points out, notwithstanding Ruskin's salient critique of industrialization, machines have often rescued workers from sheer drudgery, "and were welcomed by folk working on the factory floor" (Langlands 2017, 33). The same may be said today in artisan cheesemaking, not only of machines, but of new methods and technologies more generally. "Everybody wants something that's handmade," Allison Hooper, of Vermont Butter and Cheese, told us; but she added: "There is a real cost to that … . It's really hard work" (Hooper 2008). Randolph Hodgson—founder of the cheesemonger Neal's Yard Dairy, and business partner of Stichelton maker Joe Schneider—echoed this: "You don't want it to be too much drudgery … . There is a limit … to somebody who doesn't want to

Figure 3. Kaşar makers at Yaman Peynircilik stretching the curd.

get burned out doing a job"; in decisions he and Joe made, "quality of life" had to "play a part" (Schneider and Hodgson 2007).

Attention to such concerns was apparent in Steve Getz's milking parlor and dairy at Dancing Cow Farm. Rather than sitting on a stool, leaning in and down, to milk cows, he had installed a seat at floor level hanging over a cavity where his legs could comfortably dangle. He now found milking relaxing rather than exhausting. Most cheesemakers say washing up is half the work, but Getz had installed a commercial dishwasher in the dairy, and selected only machine-washable kit (Getz and Getz 2008).

Others incorporated new technology into the cheesemaking process itself. At Provogal, in Thessaloniki's suburbs (Greece), cheesemakers stacked trays of cheeses—still in their forms—inside an industrially-manufactured wheel the size of television's Wheel of Fortune that they rotated periodically to ensure even drainage (Figure 4); previously, they would have turned each cheese individually. When I first visited the Stichelton dairy, I spent hours helping to pierce aging cheeses, pushing a needle into each around 100 times to make holes for air to penetrate and give rise to the cheese's greenish-blue veins; soon thereafter, Joe and Randolph told us they had invested in a piercing machine—a device with multiple needles on a hinged arm that made piercing much more efficient and uniform. "Some mechanization really makes sense …" Randolph reflected, emphasizing the need to be "really attentive to the quality of it—seeing what things … you want" (Schneider and Hodgson 2007).[5]

Figure 4. Draining the curd at Provogal.

David Pye—who was Professor of Furniture at the Royal College of Arts—famously distinguished between the "workmanship of risk" and the "workmanship of certainty" (Pye 2010).[6] With the elimination of risk of failure from a productive process—often achieved by introducing new technology—scope for creativity may diminish. But despite embracing the idea of craft, most with whom we worked sought to reduce or eliminate particular risks. As Emmet has argued: "For a craft to be commercially viable and not just an expensive hobby, semi-standardization is needed to ensure productivity while maintaining high levels of quality" (Emmet 2018, 252). Provogal's draining wheel and Stichelton's piercing machine follow this logic. Anxieties may linger about technology replacing artisanry. The question Langlands poses, as he charts the historical development of topiary tools, remains salient: when does technology cease merely to aid artisanry and begin to take its place (Langlands 2017, 34-36)? But as Emmet reminds

us, "makers and creators have always employed methods to amplify their own work." In the world of lute making that he discusses, this was as true of "old" technologies (chisels and planes) as it is of "newer" ones (electric saws or digital techniques) (Emmet 2018, 261). Hence, there is always a dynamic relationship between artisans and changing technology, akin to that described by Sarah Mills who suggests (in her case, with reference to hand-weaving) that a product is only as good as the weaver *and* her tools (Mills 2018, 125-126). Conceiving of craft as the skilled use of tools to achieve quality products is precisely what animated Peio Etxeleku, who told us he was content to automatize production wherever human intervention didn't actually add value (Etxeleku 2009).

As Ivan Illich suggested, tools can displace or impoverish people, but they can also empower them (Illich 2009 [1973]). Lewis Mumford lamented that the Western World's "passive dependence on the machine" was nothing less than an "abdication of life", and he dreamed of "cultivat[ing] the arts of life directly" so as to reverse the "*technological unemployment of men*" and bring about "the *social unemployment of machines*"; but he also reminded us that it was not machines themselves, but the political, economic and moral frameworks determining their use, that most mattered (Mumford 2010 [1934], 426). Such frameworks were precisely what prompted most technological innovation that we saw.

Take, for example, the framework of consumer safety. While many made cheese without commercial starters, others were cautious. At the Abbaye de Tamié, in the French Savoie, Frère Nathanael told us that he made cheese from raw milk but added a small amount of commercial starter to compliment indigenous bacteria and ensure adequate acidification (Nathanael 2008). Others did likewise. John Putnam used a traditional "back-slop" starter (whey from the previous make), but augmented this with commercial starter (Putnam 2008), as did Comte makers we visited at La Fruitère Fromagère d'Arbois in the French Jura (Bobiler 2008). Julien Lassalle—who made Ossau-Iraty in the French Pyrénées— added a bit of commercial starter to offset the residue of disinfectant used to clean his vat (Lassalle 2009).

Wastage was another concern shaping decision-making. Jaime Borges Lopes justified aging his Serpa cheeses in refrigerated storerooms rather than on straw mats in the dairy rafters by pointing out that traditional aging led to high rates of spoilage whereas refrigeration greatly reduced wastage and led to more consistent quality (Lopes 2008b).

Concerns about environmental sustainability were another framework through which cheesemakers assessed potential changes. Frère Nathanael showed us how the Abbaye de Tamié's state-of-the-art heat-exchange system recaptured heat from the whey as it was pumped from the vat, and used it to heat the next vat (Nathanael 2008). Steve Getz similarly used a heat

exchanger, and also cooled his aging cellar by circulating chilled glycol through a radiant cooling system (Getz and Getz 2008). At Consider Bardwell Farm (in Vermont), Peter Dixon cooled the aging cellar by pumping water from a nearby well through pipes lining the cellar walls (Dixon 2008).

Moral, political and/or economic objectives were important to these cheesemakers. Decisions regarding the use of technology—old or new—were made in light of expectations that a particular tool, machine or method would either compromise these objectives or better allow their achievement. Julien Lassalle concluded: "If you change something, you have to know why you are changing it—the reason for change" (Lassalle 2009).

Who makes the machines? The craft of innovation and the domestication of technology

In his discussion of computer-assisted design, Emmet writes: "Tool making helps multiply human power and functions as a way to reduce risk and make a process repeatable and controllable" (Emmet 2018, 253). His use of the term "tool *making*" (emphasis added) prompts reflection on how such tools are themselves produced, and by whom. Take, for example, the *spino* used by Parmigiano-Reggiano makers—a globe-shaped matrix of stainless-steel blades affixed to a long handle and used to reach into the pointed bottom of conical vats to cut the curd. Some makers showed us precursors to this stainless-steel version—made by soaking a white thorn branch, bending back its twigs, and forming them into a ball. Its form and function were similar, but unlike the modern tool, it was crafted by the cheesemaker him/herself (Manini 2008).[7] The replacement of the hand-made *spino* by its industrial version raises important questions about how technology itself is made, and the implications of this for artisan craft.

Richard Sennett has written: "Skilled operatives live with and through machines but rarely create them in modern industry. Technological advance comes in this way to seem inseparable from domination by others" (Sennett 2008, 108). Like the operatives about whom Sennett writes, cheesemakers sometimes felt alienated by new technology. Parmigiano-Reggiano makers sometimes lamented the replacement of the wooden *spino* by a tool they had to purchase from an equipment supplier. Others were nostalgic for wooden stirring paddles, draining tables, or molds—which had taken time to make, but were as much an expression of skill as the cheeses made with them.

Still, we saw cheesemakers using tools of their own design and manufacture—many of which went beyond the making of traditional tools to constitute home-made technological innovation. Francisco Javier Muñoa showed us a stainless-steel tool that he had made. Whereas most cheesemakers cut curd into blocks with a knife, making a series of free-hand

parallel cuts in one direction and another series perpendicular to these, Muñoa used this tool of his own invention—a rectangular box divided into four sections, open at the top and bottom—like a cookie cutter, to produce four equal-sized blocks at once.

Others had constructed the presses they used. On the Greek island of Crete, Graviera makers Sifis and Manousos Stayrianoudakis had placed a wooden baton on top of a form lid; two threaded rods passed through the baton, one anchoring at the back to the table on which the form sat, the other hooking under a lever bolted to the front of the table; the press could be tightened by hanging a large block of cement on the end of the lever. The home-made press that Trees van Leeuwen and her mother used to make Leiden cheese in South Holland (Netherlands) was composed of a wooden box-frame over a table on which cheeses sat in their forms; passing down through the frame were flat stainless-steel posts attached to wooden disks—together resembling pistons—that came to rest on top of the forms; a pin could be inserted in one of the many holes lining the post, a lever laid over it, and home gym weights hung from the end of the lever (Figure 5). The press that John Putnam made was electrically-powered; four steel bands connected two circular steel rings—one beneath, and one on top, of the cheese form. An electric motor fastened within the top ring powered a small hydraulic piston that pressed on the cheese.

Many devoted similar care to making shelving systems in the caves and storerooms where they aged cheese. David Major had mounted racks on his cave wall into which the ends of short shelves could be inserted; holding four cheeses each, these cantilevered shelves could easily be shifted, along with the cheeses on them, to circulate stock in the cave. At the Cellars at Jasper Hill in Vermont, Mateo Kehler showed us stainless-steel racks he had built for his Cheddar cheeses; instead of shelves, they held long cages, with boards lining top and bottom, suspended at each end by steel pins to which a turning handle was connected, allowing them to be rolled periodically, flipping over all of the cheeses simultaneously and with much greater ease than pulling each one off a shelf, turning it over, and pushing it back on.

These simple machines of indigenous design were often wonderfully ingenious. Through their use, greater efficiency and consistency of quality was generally achieved. Cheesemakers saw resultant reductions of risk not as detracting from their craft, but rather as part and parcel of it, for they had themselves crafted these tools to extend control over their productive process. Like the cheeses made with them, these tools were the products of artisan craft, designed and calibrated to serve the specific needs of each cheesemaker.

Creativity in the use of technology also included repurposing objects to imaginative new ends. David Major formed his cheeses in plastic salad straining bowls (Major 2008), and at Ram Hall Farm, in Warwickshire

Figure 5. The van Leeuwens' Leiden cheese press.

(United Kingdom), Linda Dutch formed her Berkswell cheeses in plastic colanders (Dutch 2008), each resulting in aesthetically-pleasing crust texture. David Major had filled PVC tubing with salt and capped the ends to create home-made weights that he set on top of his cheeses soon after they were formed to facilitate expression of whey. Peter Dixon used recycled milk jugs, filled with water, to weigh down a lever attached to a piston pressing on the cheeses in his homemade press. Steve Funk spoke of cheesemakers using railroad ties as weights, and car jacks as presses (Funk 2008). At the Abbey of Regina Laudis in Connecticut, Mother Noella Marcellino had repurposed an old printing press—once used by artisans of another kind—to press her cheeses. On his farm in Pennsylvania, Brian Futhey showed us a shipping container that he had covered with earth, hoping to make of it an aging cave (Futhey 2009).

Whether by manufacturing their own tools, or imaginatively redeploying everyday objects, cheesemakers were not only willing to innovate, but also saw the creation and/or adoption of new tools and methods as an essential part of their craft.

Replacing tradition, or ensuring its survival? Conservation by innovation

Innovation did not always displace tradition. Often, the adoption of new technologies or methods was the very means by which cheesemakers

conserved tradition. We encountered a striking example in Reggio Emilia, where, as mentioned above, Luciano and Mateo Catellani made cheese from the milk of a heritage breed— Reggiana's *Vacche Rosse* (Red Cows). Historically, farmers bred these animals for both milk and meat, and also used them for traction. They tolerated the heat well, and thrived on local fodder. But with the arrival of tractors after World War II, cattle were no longer used for draught power, and farmers began to replace the *Vacche Rosse* with other breeds—French Limousins for meat, and Holstein-Friesians and Swiss Browns for milk—even though these animals were poorly suited to the environment. Luciano's father was ridiculed (called "as far behind as a pig's tail") for keeping 60-70 *Vacche Rosse* long after progressive farmers abandoned the breed, but Luciano took an interest in these animals as a teenager in the 1980s, by which time their total population had fallen to around 1000. Studying agronomy, he learned that their milk had higher protein levels, gave better yields in cheesemaking, and produced a tastier cheese that fetched a higher price. Rescuing the breed from the brink would not be easy, however. Breeding had to balance improvement with the preservation of genetic diversity. To this end, Catellani turned in 1996 to a computer program previously used by breeders of the Italian Mediterranean Buffalo (whose milk was used to make Mozzarella) when the population of these animals had similarly declined in the 1970s. The program measured degrees of consanguinity between animals while also accounting for desirable traits such as yield, and it guided Catellani in choosing which bulls to mate with which cows (Figure 6). To avoid injury to younger cows, he used artificial insemination. By 2008, the program had helped *Vacche Rosse* numbers increase to 2700 animals. Meanwhile, fellow Parmigiano-Reggiano makers in the Modena region adopted the program to preserve their local heritage breed—the *Vacca Bianca Modenese* (Catellani 2008; Catellani and Catellani 2008; Marchi, Redeghieri and Venturi 2008).

Cheesemakers we visited elsewhere used other modern technologies for the express purpose of preserving tradition. In many regions, there were long traditions of transhumance—driving flocks or herds on foot from lowlands to highlands, and back again, seasonally. These journeys often took days, even weeks. In many places, however, landscapes had been reshaped: land had been privatized, cutting off transhumance routes; or roadways had carved up and/or connected places in new ways. While many felt it essential to continue grazing livestock in high-mountain pastures in warm summer months, they often found it impractical—even impossible—to walk their animals there, but they found new ways to move them. Shepherds we visited in northern Greece, for example, used trucks to carry animals to and fro—practicing transhumance by modern transport (Mantzaris and Velivasis 2011).

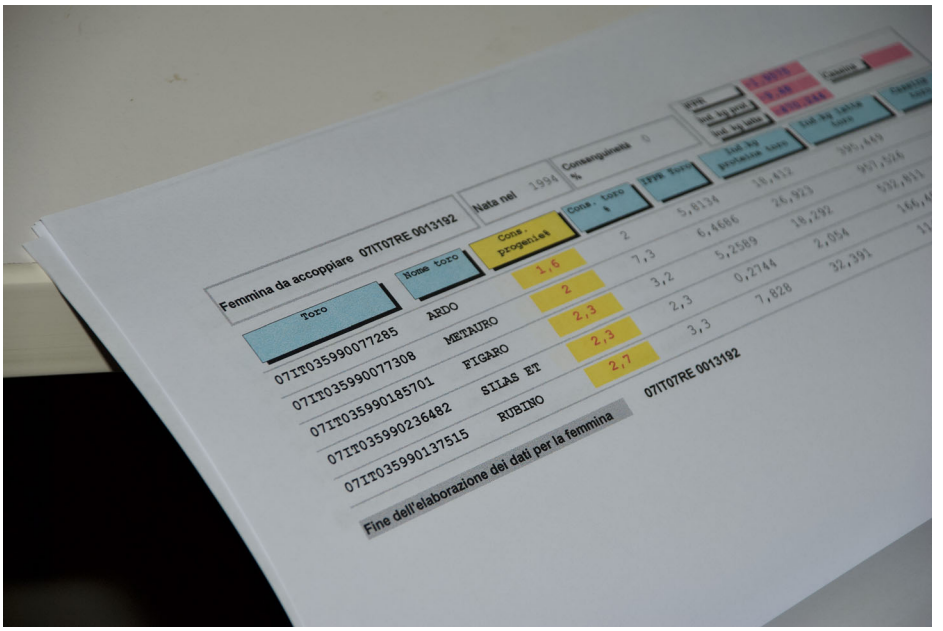

Figure 6. Data from the Catellani's breeding computer program.

Another modern method used to preserve tradition was the isolation and laboratory-reproduction of starter cultures. While cheesemakers traditionally made their own starters—using whey from previous makes to kick-start acidification—industrial cheesemaking has depended upon the use of starters reproduced in controlled laboratory settings (even if these cultures were originally harvested in the same way) (Funk 2008; Kindstedt 2005, 57). But whereas commercial starters—with more limited spectra of cultures—are used by many cheesemakers today (contributing to the diminution of microbial diversity and the reduction of complexity and diversity of flavours), many with whom we worked were attracted to having cultures harvested from their own vats, isolated, and reproduced for them, allowing them to more conveniently, consistently and safely use cultures indigenous to their milk and their dairies. In Somerset (United Kingdom), Cheddar maker Jamie Montgomery (who took over production from his mother years ago) used laboratory-reproduced starters sourced from his mother's vat, allowing him to preserve family culture—on micro and macro levels—with the aid of modern technology. When we met with Peio Etxeleku, and with Wiżajny maker Maria Micielica (in Podlaskie, Poland), each hoped to do the same, and were optimistic that their respective national governments' interpretations of EU regulations would soon permit this (Etxeleku 2009; Micielica 2010). In Spain, we were told by the *consejos* representing makers of both Idiazabal and Cabrales that they were working to develop indigenous starters for the exclusive use of members of their respective

PDOs, which would allow them to consistently and safely produce products reflecting local *terroir*. The Cabrales PDO was also working to isolate autochthonous penicillium to replace commercial penicillium in making this blue cheese (Mestanza 2011; Marcos 2010).

The Cabrales *consejo* was also using modern technology to preserve natural caves in which they aged cheese. Where cheesemakers had, in recent decades, started using caves in the lowlands—closer to towns where they sold their wares—these were not as well suited to aging as more humid caves at higher altitude that yielded more flavorful cheeses, so the *consejo* was working to improve access to the 26 best high-altitude caves and to supply them with electricity despite their remoteness (Cueva Exposición Cabrales 2010; Prieto Álvarez and Prieto Álvarez 2010; Marcos 2010). French Roquefort makers—who operated on a much larger scale—had adopted more sophisticated technology to enhance natural caves used for centuries to age their cheeses. They fit mechanical vents to compensate for minute fluctuations in temperature and humidity by regulating airflow, allowing them to better safeguard these complex ecosystems (Société 2009, 1).

Future traditions? The invention of tradition and traditions of invention

Thus far, we have considered the wide array of dispositions and motives shaping cheesemakers' decisions regarding innovation, and the many forces with which they have had to contend as they reproduce traditions valued by themselves and their customers. By way of conclusion, we now turn to the place innovation ultimately holds within the very confines of cheesemaking tradition. Bromberger has written: "Paradoxically, today's farmhouse cheese-makers embody 'tradition', not because of the methods they faithfully carry forward, but because the products that they make continue to evolve" (Bromberger 2006, 90). Indeed, the reproduction of tradition has always entailed its evolution. And the elements that define particular craft traditions all have moments of origin (Geyzen, Scholliers and Leroy 2012, 49).

In hindsight, we see that most hallowed traditions were once innovations. Oscypek cheeses—with a cylindrical core and two conical ends—are known for the intricate patterns imprinted on their core. Oscypek maker Kazimierz Furczoń told us this dated to the 16th century, when shepherds grazing flocks in mountain pastures passed time carving, and started making wooden bands that they fastened around the fresh curd to imprint these designs (Furczoń 2010). Dutch cheeses are characteristically dense and dry as a result of washing the curd with hot water; this technique was

pushed to extremes when Dutch cheesemakers sought to drive more moisture and fat out to make cheeses that would keep during sea journeys to the East Indies. Portuguese ewes' milk cheeses are distinctive for their slightly bitter taste, resulting from the use of cardoon thistle to curdle the milk instead of rennet; according to regional historian Carlos Castelhano, shepherds in the Serra da Estrela had used animal rennet until the *Reconquista*, when they started grazing their flocks on the warmer Alentejo plains in winter, where cardoon grew (Castelhano 2008). Makers of Mozzarella di Bufala Campana assert that the use of milk from the Italian Mediterranean Buffalo is essential to the traditional character of this cheese; but the buffalo is not indigenous, originating instead on the Indian subcontinent, and was likely brought to Italy with the barbarian invasions around 600 AD, or by Arabs to Sicily and, subsequently, to Campania by Norman Kings (Testa 2010). In time, each of these innovations became tradition—essential to the cheeses with which they were associated.

Elsewhere, I have written how, in the French Auvergne, cheesemakers looked upon the use of cast-iron screw-presses as more authentic than the use of modern hydraulic presses, but how these presses were, in their time, the products of industrial innovation, having replaced lever presses previously considered more traditional, and how even these lever presses were an innovation replacing the use of static weights on top of the form (West 2016, 409). If today's traditions were once innovations, it follows that today's innovations may one day be traditions. We see this in the large warehouses where Parmigiano-Reggiano and Comté have long been aged. These cheeses must be turned regularly to ensure that they mature evenly on both sides—an arduous task, performed by hand until the recent invention of robotic turning machines that work day and night, moving up and down stacks of shelves some 8 meters high and 20-40 meters long, with laser guidance to pinpoint a cheese, grasp it, pull it out, flip it, and place it back on the shelf. As these machines turn a cheese, they also brush it, knocking back the population of mites that inevitably feed on the crust. Within a short time, these machines have not only become ubiquitous where such cheeses are aged, they have also come to be celebrated like any tradition—an expected element in the cheese's productive ecology (Breniaux 2008).

Shils tells us that, if innovation is to be successful, it eventually ceases merely to *refer* to tradition, and ultimately *becomes* tradition (Shils 1981, 90). But what of inertia? Shils tells us that it can cut one of two ways: "Traditionality is reinforced by the perception of traditionality," he writes; but he also suggests that "the tradition of inventiveness is reinforced by the perception of inventiveness in others" (Shils 1981, 88). Heather Paxson, who has worked with American craft cheesemakers, makes a similar point when she refers to a "tradition of invention." She writes: " … in the United

Figure 7. Frère Nathanael explaining the workings of the Abbaye de Tamié production line.

States, where progress is valued over patrimony, what is invented as tradition—what is enshrined as a matter of cultural heritage—is continual change and innovation, not continuity" (Paxson 2013, 6).

What Paxson has seen in pronounced form in the United States, we have seen in no small measure in the many places where we have conducted research: traditions of invention, grand and small. To be sure, European conceptions of tradition may be more defined by longstanding social institutions working within recognized geographical spaces, and consolidated by PDOs, while in the United States, the absence of such clearly demarcated traditions, and a relatively more stringent food safety regime, may afford different emphases to the dynamics between continuity and change. Nonetheless, in both Europe and America, among longstanding producers and newcomers, we have seen ambivalence regarding the sanctity of tradition. And in myriad ways, cheesemakers with whom we have worked have practiced what is arguably the most widespread and enduring artisan tradition, namely the "invention of tradition" itself.

We end with the example of the cheese room at the Abbaye de Tamié, where monks have made cheese since the 12th century. When we visited, Frère Nathanael presided over a fully-mechanized production line, kitted out with state-of-the-art stainless-steel vats and presses (Nathanael 2008) (Figure 7). His irrepressible fondness of technology both contrasted with methods used at the abbey long ago and fit within a "tradition of invention" sustained by abbeys like his over centuries. For these repositories of craft tradition have paradoxically long been at the avant-garde of cheesemaking—first adopters of new technology which, in due course, became sacrosanct—just as Tamié was when we visited (Nathanael 2008). So fundamental are such forms of innovation to craft cheesemaking, one must consider them essential to the very traditions they help to conserve.

Notes

1. See also (Paxson 2013, 14).
2. See also (Paxson 2013, 213).
3. Leroy et al. (2013, 135) similarly describe the (re)introduction of traditional methods in industrial meat curing.
4. Lewis Mumford also called attention to the fine line between technology that enhances human skill and that which replaces it (Mumford 2010 [1934], 10).
5. Leroy et al. similarly argue that producers of fermented meat products must not only synthesize tradition and innovation, but also ensure that innovations improve product quality (Leroy et al. 2013, 136).
6. See also (Paxson 2011, 117-119).
7. Cheesemakers elsewhere historically made and used similar curd breakers, such as in the Portuguese Alentejo and the Basque Hegoalde.

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